Subst. a1

1. An x-ray device, comprising:

(a) a vacuum enclosure;

(b) an integral cathode disposed in said vacuum enclosure, said integral cathode including an emitter capable of discharging electrons, said emitter shaping an electron beam by causing at least some discharged electrons to converge at a focal spot;

(c) a power source connected to said emitter so that transmission of power from said power source to said emitter causes said emitter to discharge electrons; and

(d) a target anode disposed in said vacuum enclosure and having a target surface positioned to receive said electron beam generated by said emitter.

Sub C1

2. The x-ray device as recited in Claim 1, wherein said focal spot is located proximate to said target surface of said target anode.

3. The x-ray device as recited in Claim 1, further comprising a support cartridge, said support cartridge receiving said emitter and maintaining said emitter in a desired configuration.

4. The x-ray device as recited in Claim 3, wherein said support cartridge facilitates substantial electrical isolation of said integral cathode.

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Delet. a2

5. In an x-ray tube comprising a vacuum enclosure having disposed therein a target anode with a target surface, an integral cathode disposed in the vacuum enclosure and being spaced apart from the target surface of the target anode, the integral cathode comprising:

(a) an emitter capable of discharging electrons, said emitter shaping an electron beam directed at the target surface of the target anode by causing at least some discharged electrons to converge at a focal spot; and

(b) a support cartridge, said support cartridge providing structural support for said emitter.

Sub C1

6. The integral cathode as recited in Claim 5, wherein said focal spot is proximate to the target surface of the target anode.

Sub a3

7. The integral cathode as recited in Claim 5, wherein said emitter is received in said support cartridge, said support cartridge causing said emitter to assume a desired configuration when said emitter is fully received in said support cartridge, and said support cartridge maintaining said emitter in said desired configuration.

8. The integral cathode as recited in Claim 5, wherein said desired configuration comprises an emitter cross-section substantially in the shape of an arc so that a concave side of said emitter is directed towards the target surface of the target anode.

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9. The integral cathode as recited in Claim 5, wherein said emitter is substantially composed of a refractory metal.

10. The integral cathode as recited in Claim 5, wherein said emitter is composed of a combination of tungsten and rhenium.

Cont. C1

11. The integral cathode as recited in Claim 5, wherein said support cartridge comprises at least one electrically conductive portion, said electron beam and said focal spot being selectively manipulated by application of a voltage to said at least one electrically conductive portion.

12. The integral cathode as recited in Claim 5, wherein said emitter comprises a plurality of subsidiary emitting portions.

13. The integral cathode as recited in Claim 12, wherein said plurality of subsidiary emitting portions are integral with each other.

14. The integral cathode as recited in Claim 5, wherein said emitter comprises at least two subsidiary emitting portions not parallel to each other, said at least two subsidiary emitting portions cooperating to facilitate said convergence of said at least some discharged electrons at said focal spot.

15. The integral cathode as recited in Claim 14, wherein said at least two subsidiary emitting portions are integral with each other.

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16. The integral cathode as recited in Claim 14, wherein said at least two subsidiary emitting portions are disposed in a substantially "V" shaped configuration.

17. The integral cathode as recited in Claim 5, wherein said emitter is substantially bowl shaped.

Cont C1

18. The integral cathode as recited in Claim 5, wherein a plurality of cut out portions are defined in said emitter, said plurality of cutout portions collectively defining a an electrical current path.

19. The integral cathode as recited in Claim 5, wherein said support cartridge facilitates substantial electrical isolation of the integral cathode.

20. The integral cathode as recited in Claim 19, wherein said support cartridge is substantially composed of iron, said iron being cataphoretically coated so that at least a portion of said support cartridge is rendered electrically non-conductive.

21. The integral cathode as recited in Claim 19, wherein said support cartridge is electrically non-conductive.

22. The integral cathode as recited in Claim 21, wherein said support cartridge is substantially composed of ceramic.

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23. A method for manufacturing an integral cathode for an x-ray tube, comprising the steps of:

(a) shaping emissive material so as to form an emitter;

(b) applying a force to said emitter so as to introduce a deformation in said emitter;

(c) maintaining said deformation in said emitter; and

(d) defining an electrical current path in said emitter.

Concld C1

24. The method as recited in Claim 23, wherein at least one of said steps is at least partially performed by a robot.

25. The method as recited in Claim 23, wherein said step of defining an electrical current path in said emitter occurs before said step of applying a force to said emitter.

26. The method as recited in Claim 23, wherein said step of defining an electrical current path in said emitter comprises removing at least one selected portion of said emitter.

27. The method as recited in Claim 26, wherein said step of removing at least one selected portion of said emitter is performed by a robotically controlled laser.

add a4

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